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Stability analysis of resonant triads in a stably stratified uniform shear flow LIMA BISWAS, PRIYANKA SHUKLA, Indian Inst of Tech-Madras — We analyze the stability of resonant triads of internal waves in a two-dimensional linearly stably stratified uniform shear flow, vertically confined between two parallel walls, by the amplitude equations for interacting waves. The interaction of two primary internal modes with the same frequency is considered, the superharmonic wave, generated by such interaction, is also an internal mode. For different buoyancy frequencies, we show the existence of triads formed by internal modes having the wave vector and frequency pairs as $(\mathbf{k_m},\omega)$, $(\mathbf{k_n},\omega)$ and $(\mathbf{k_m} + \mathbf{k_n},2\omega)$. The linear stability of resonant triads, around the exact equilibrium solution, is studied for various interactions. Triads containing the lowest mode number wave are linearly unstable. The exact solution of amplitude equations is presented under the pump-wave approximation, where the amplitude of one wave in a triad, namely, pump-wave, is larger than the amplitudes of other two waves. Neglecting the effect of two smaller waves on the pump-wave, we show that the triad is unstable when the wave with the lowest mode number acts as the pump-wave.

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